

United States Military Academy
West Point, New York 10996

**ENABLING KNOWLEDGE MANAGEMENT FOR THE JOINT
FORWARD OPERATING BASE (JFOB)/ BASE CAMP
COMMUNITY OF PRACTICE (COP)**

OPERATIONS RESEARCH CENTER OF EXCELLENCE
TECHNICAL REPORT DSE-TR-0624
DTIC #: ADA456500

Lead Analyst

MAJ Travis J. Lindberg, M.S.
Analyst, Department of Systems Engineering

Senior Investigator

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Lieutenant Colonel Simon R. Goerger, Ph.D.
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Approved by

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Abstract

Establishing an effective and secure operating and logistics base under austere conditions, either at home or abroad, regardless of whether the origin of the crisis is military or strictly humanitarian in nature, is a complex mission. Unfortunately, the doctrine supporting the life-cycle management of base camp facilities is poorly codified and usually unstructured due to the disparate nature of the governmental organizations tasked with accomplishing these missions. In order to overcome this problem, the Department of Systems Engineering at the United States Military Academy (USMA) at West Point has developed functional and non-functional requirements for, and has partially implemented a commercial-off-the-shelf (COTS) knowledge management (KM) system that facilitates the sharing of this type of specialized information for military and civilian members of the "Base Camp Community of Practice (CoP)".

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The authors would also like to acknowledge the following individuals from the U.S. Army Engineer School (USAES) for their perseverance and demonstrated vision when they volunteered to accept the mantle of responsibility as the U.S. Army's proponent for Base Camp and Joint Forward Operating Base issues: BG Todd Semonite, Dr. Rebecca Johnson, Mr. Kurt Kinnevan, Mr. Albert Vargenko, and Mr. Michael Wolford.

Finally, the authors would like to acknowledge the groundbreaking work that the Company Command team has done with respect to Army-related Knowledge Management (KM): LTCs Nate Allen, Tony Burgess, and MAJ Steve Schweitzer; and just as importantly, for sharing their lessons learned with us!

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Chapter 1: Introduction

1.1 Problem Statement

The Department of Systems Engineering at USMA has run a series of annual workshops to bring together practitioners from the 'Base Camp Community of Practice' (known hereafter as the Base Camp CoP). At the 3rd Annual Base Camp Conference, which was held at West Point, New York in May 2005, these key Base Camp CoP issues were identified (Thompson and Trainor, 2005):

- The Department of Defense (DoD) needs to simplify the funding processes for base camp development;
- DoD as well as the services (e.g. Army, Navy) need to establish organizations as proponents for the Base Camp CoP;
- There is a need for a system that allows Base Camp CoP members to share knowledge related to the life cycle management of base camps and Joint Forward Operating Bases (JFOB).

To address the third issue the USMA members of this Base Camp CoP initiated a study to help determine the requirements for a KM system that could be used by the larger Base Camp CoP to help military units better understand base camp life cycle management-related tasks. The intent was that the study on the KM system would be completed by the 3rd Annual Base Camp Conference in May 2006 in order to present the findings and begin the implementation of the KM system at that time.

This paper focuses on the value-added by using KM for Base Camp CoP initiatives. Specifically, the authors will present the framework of their recommended commercial-off-the-shelf (COTS) KM design solution, dubbed ArmyBaseCamp/JFOB.net. We will also show that the value-added to the Base Camp CoP is analogous to the value that KM solutions can potentially provide to the Engineering Management (EM) community for related issues. The authors will attempt to do this by illustrating a few of the critical Base Camp/ JFOB life-cycle management characteristics that make it an attractive target for the successful use of KM initiatives.

1.2 Background

In order to get a better understanding of the issues surrounding the Base Camp CoP, it is important to understand the history and the various stakeholders that comprise the Base Camp CoP. A base camp can be defined as an evolving military facility that supports the military operations of a deployed unit and provides the necessary support and services for sustained operations (Ezell, et al. 2001). The modern impetus to “fix” the problems associated with base camps and forward operating bases center around America’s foray into the Balkans following the signing of the Dayton Peace Accords in 1995. It was certainly not the first time in the history of the United States that U.S. forces had deployed in such large numbers from fixed locations for extended periods of time. However, unlike the Persian Gulf War, it was the first large-scale deployment since the dissolution of the Soviet Union where units could be expected to occupy terrain for (potentially) years, instead of months. Furthermore, as harsh and austere as the desert environment in the Persian Gulf might have been in 1990 – 1991, the logistical support requirements for armored forces during a Balkan winter posed an even more daunting challenge to military planners and leaders back in the 1995 – 1996 timeframe.

Fast-forward to 2006, approximately 10 and 15 years after the initiation of U.S. operations in the Balkans and the Persian Gulf War, respectively. Those junior and intermediate-level military commanders who were all-to-familiar with the difficulties associated with the establishment and management of base camps during the immediate aftermath of the post-Cold War era, are now in positions to enact policy and leverage information technology in order to ensure that lessons learned and best practices are shared throughout the DoD community, and beyond (Semonite, 2006).

Leaders in the DoD community who have grappled with base camp life cycle management issues on the ground in the post-Cold War environment have also been charged with transforming DoD in order to ensure that our armed forces remained “relevant and ready” to support the President’s National Security Strategy (White House, 2006). The current Chief of Staff of the Army (CSA), General Peter Schoomaker has tied force transformation initiatives to the Army’s ability to leverage information technology. This relationship is depicted graphically in Figure 1 (Schoomaker, 2006).

EVOLVING ARMY TRANSFORMATION

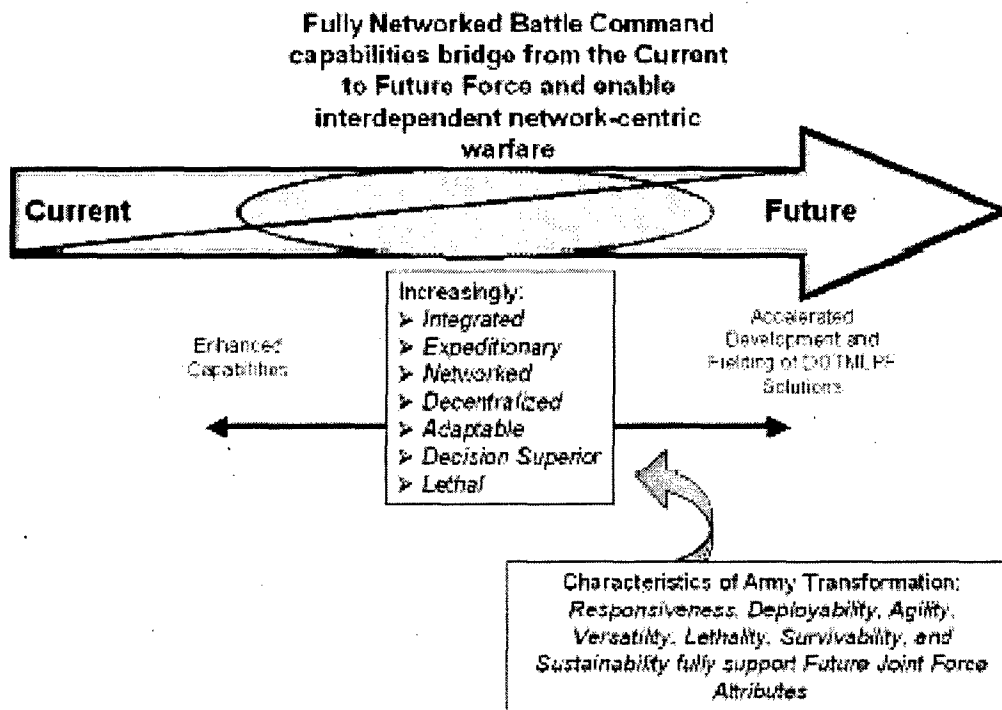


Figure 1. Relationship Between DoD Transformation and Information Technology.

An increasingly robust IT capability, coupled with the need for more “networked, decentralized, and decision superior” leaders and members of the armed forces (taken from Figure 1) has resulted in the DoD leadership embracing Knowledge Management (KM) initiatives as a means to achieving DoD’s strategic vision.

1.3 Base Camp Management Relation to Engineering Management

Engineering managers and those charged with the life cycle management of base camps and forward operating bases face similar challenges. Both must tap into and build upon the existing core competencies within their organization and be able to leverage technology in order to solve complex problems while maintaining a competitive advantage.

Life cycle management issues facing an engineering manager are similar to those facing base camp managers. The Institute of Electrical and Electronics Engineers (IEEE) defines the life cycle stages as (IEEE, 2005):

- a) Concept Stage;
- b) Development Stage;

- c) Production Stage;
- d) Utilization Stage;
- e) Support Stage;
- f) Retirement Stage.

A base camp life cycle matures from planning, to development, use and maintenance, and finally, retirement – all stages which mirror the typical life cycle of a project for an engineering manager.

There are also similarities in the relationships between the base camp life cycle manager and the engineering manager in that a *mission* (e.g. attack, defend, etc.), in military terms, can be thought of as being analogous to a *project* in the business community (Miller, 2006). If one looks at the definition and objectives of both a *mission*, and a *project* (Meredith and Mantel, 2003), there can be little doubt that managing the life cycle issues for a base camp is both a *mission*, and a *project* – the management of which is an essential core competency of the engineering manager.

Chapter 2: Methodology

2.1 Why KM Applies to Base Camp Life-Cycle Management

The DoD's current motivation to embrace KM initiatives mirrors the business community's experiences with KM in the late-1990s. At that time, the business community began to seriously grapple with the impact of pending baby-boom generation retirements from the workforce. The concern was how to capture and transfer decades of experience and *knowledge* (both *explicit knowledge* (i.e. that which is stored or able to be retrieved) and even more importantly, *tacit knowledge* (i.e. what is maintained in one's brain and is not easily recorded or conveyed)) and its impact on business operations. Business experts such as management-guru Peter Drucker (1994; quoted in Maier, 2004) stated that *knowledge* represents the key concept to explain the increasing velocity of the transformation of social life in general and the way businesses and social institutions work in particular.

While Drucker and Maier were interested in the domain of knowledge management vis-à-vis business operations and best business practices, their comments about the power that is derived when an organization is able to effectively harness its knowledge supports the initiatives expressed by leaders in the defense community. Perhaps even more profound, though, is when Maier goes on to articulate the motivation for KM as a means of sharing information horizontally throughout and between the structures of organizations (as opposed to a hierarchical or vertical flow of knowledge and information):

“...whereas the flow of knowledge within a business process is (1) easier to determine and (2) easier to optimize, it is the flow of knowledge between business processes, the interfaces between different organizational units and topics that might provide the highest potential for innovation and competitive advantages”.

Most organizations within the base camp CoP are disparate agencies with no hierarchical relationships tying them together. They exist in all military services (Army, Navy, Air Force and Marines) and in many civilian field agencies and contractors supporting base camps worldwide. Through our recent annual base camp workshops, it became strikingly clear that there existed a

real need to share information horizontally throughout and between organizations in the base camp CoP. KM seemed a natural fit for this problem.

2.2 Stakeholder Analysis

Given a brief history of the problem, as well as an idea about where the KM initiative fits into the larger force transformation environment, it is then necessary to identify the stakeholders associated with our particular KM system development scenario as it impacts the base camp CoP. Stakeholders include:

- a) the KM system users;
- b) Base Camp CoP decision-makers, sponsors, owners, and senior leaders;
- c) KM system operators and administrators;
- d) KM system beneficiaries; and,
- e) KM system victims or opponents.

As in most cases involving non-trivial problems, stakeholders may fall into one or more of the aforementioned groups. Table 1 reflects a sample of this first set of stakeholders, the KM system users. It should be noted that this is truly a *joint* problem by virtue of the fact that all of the armed services are affected by base camp CoP initiatives. It is also important to point out that while other government organizations (e.g. Departments of Homeland Security and State) might not currently be “officially” embraced by the DoD base camp CoP, it goes without saying that efforts should be made to include them due to the nature of the missions of some of their subordinate organizations (e.g. FEMA, USAID). The same can be said for members of the armed forces that are part of NATO and our coalition partners.

Table 1. Sample of the Base Camp CoP Stakeholders.

Major DoD Subordinate Element	Organizations included, but not limited to:
Branches of the Armed Service (U.S. Army, Navy, et. al.)	Staff elements at various levels of command in the various armed services; U.S. Army Corps of Engineers (USACE) (to include both USACE districts, as well as USACE R&D laboratories); Engineer schools for each of the branches of the armed services; service academies; etc.
Unified Combatant Commands	Central Command (CENTCOM) staff elements, Northern Command (NORTHCOM) staff elements, etc.

Figure 2 and 3 depict the relationships and roles of the other stakeholders. Beneficiaries include the users of the system, the senior leaders who benefit from having more knowledgeable

individuals within their organizations, and DoD contractors who provide the administrative and IT support for the KM systems. Opponents may include those entities and nations that oppose the United States' National Security Strategy, leaders or DoD employees who may feel threatened by increasingly knowledgeable members, as well as DoD contractors who failed to earn a contract to provide IT support to the U.S. Government. Unfortunately, a more detailed stakeholder analysis is beyond the scope of this report.

Figure 2 previews the COTS KM solution that has been implemented and shows the key stakeholders' and their relationships vis-à-vis the Base Camp CoP.

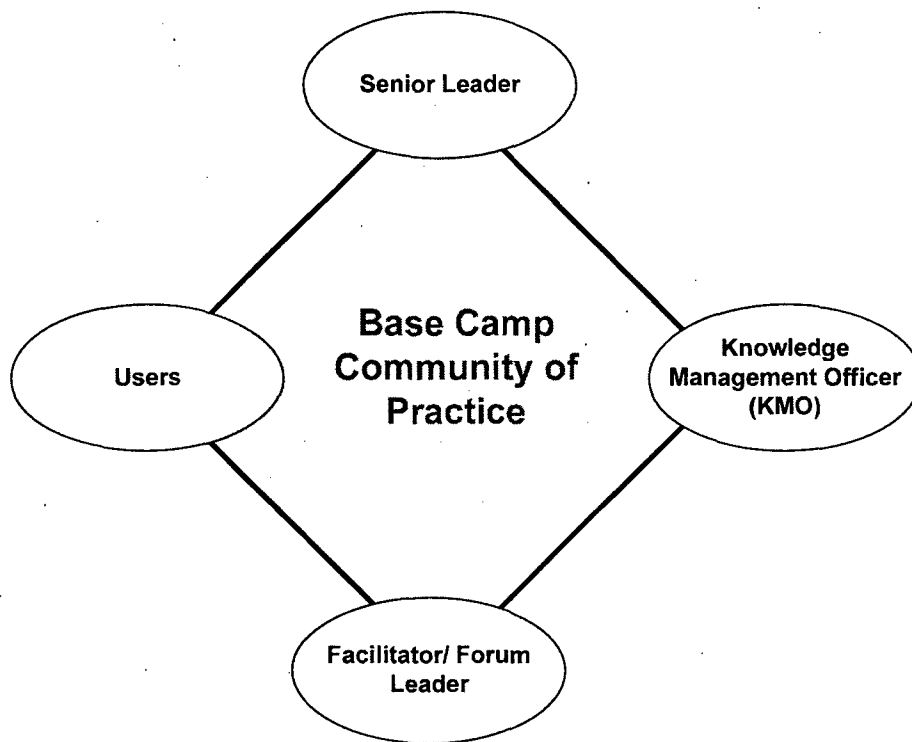


Figure 2. The Paradigm for a KM Community of Practice (CoP) Forum (BCKS, 2006).

For the sake of brevity, a detailed list of duties and responsibilities for each of these stakeholders has been omitted.

Literature in the KM field indicates that the success of a project of this nature is directly related to the organizational culture's willingness to transfer knowledge. Moreover, it has been shown that the relationship between organizational culture and knowledge transfer has a statistically significant impact on the success of a project (Karlsen and Gottschalk, 2004).

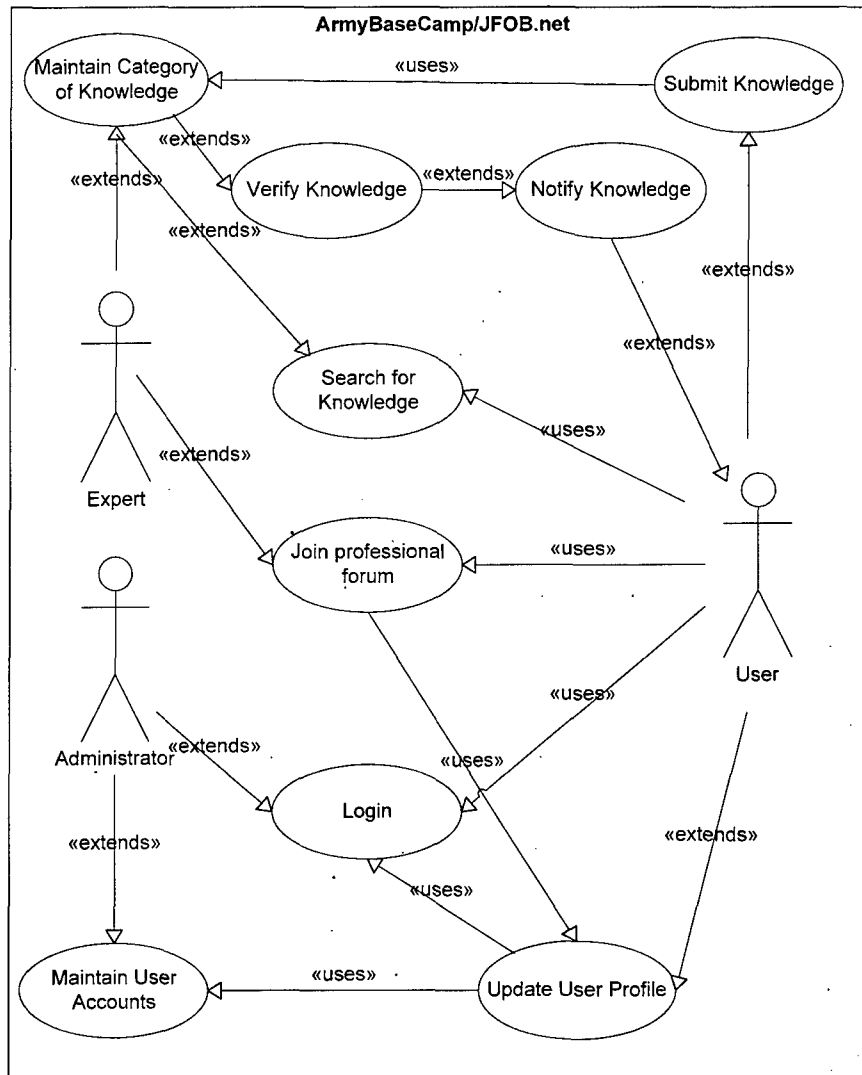


Figure 3. A simple, UML-based Use Case Diagram (Arlow and Neustadt, 2003) that shows the various stakeholder functions within an actual KM system design.

Since the organizational culture is shaped largely by its senior leadership, getting senior leader “buy-in” prior to attempting to implement the KM solution was paramount – and was directly related to the U.S. Army Engineer School’s decision to sign on as the base camp CoP proponent for the Army. Without this senior leader involvement, there would be little chance of a successful KM initiative being implemented on behalf of the base camp CoP.

2.3 Functional Analysis

The abbreviated stakeholder analysis just presented allowed us to do two things:

- a) Understand the environment in which the system is to operate over its lifecycle; and
- b) Understand what the various stakeholders value vis-à-vis a KM system for the Base Camp CoP.

The next step was to take these stakeholder needs and map them to the system objectives, as well as functional and non-functional requirements.

Before continuing with the discussion on functional analysis, it should be noted that after several months of conducting a literature review and analyzing functional requirements for a KM system, the study authors discovered the existence of a COTS KM solution that is sponsored by the Department of the Army (DA). The name of this existing, overarching KM system is the Battle Command Knowledge System (BCKS), available at <https://bcks.army.mil/>. Our initial KM solution design consisted of a separate base camp CoP portal contained within the BCKS architecture. This now allowed the study to focus on three things vis-à-vis functional analysis for the base camp CoP portal within BCKS:

- a) Understanding and conveying the objectives of KM to the base camp CoP;
- b) Generate and validate base camp-specific KM system functional requirements and constraints through conference working group sessions;
- c) Receive senior leader and community member “buy in” for the recommended KM system design solution.

Figure 4 attempts to graphically depict the relationship between the various objectives of KM initiatives (from focus area *a* described in the preceding paragraph) and the various stakeholders, along with the functions that they perform for the Base Camp CoP.

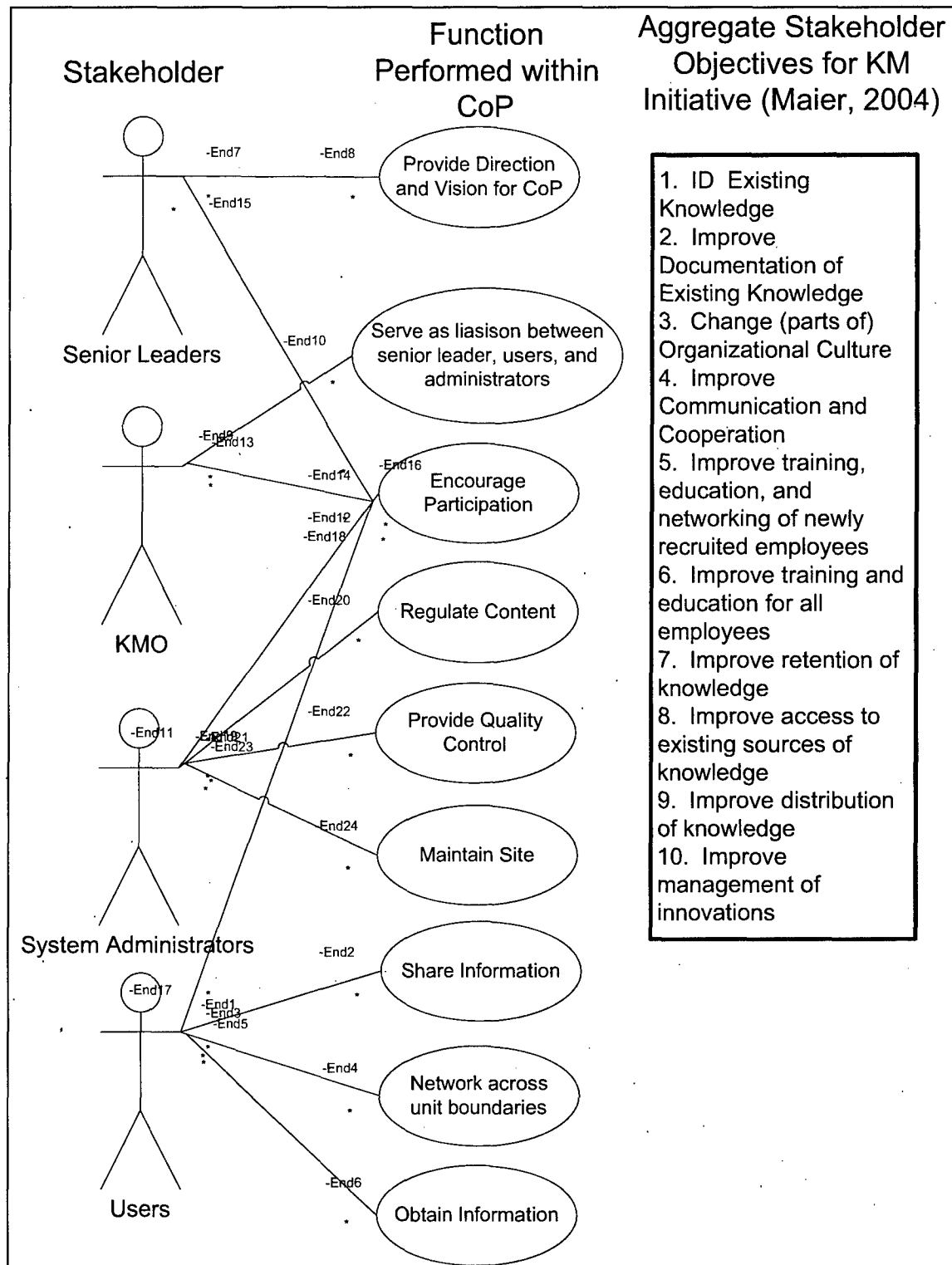


Figure 4. Stakeholders and the objectives of KM initiatives.

The mapping between stakeholder needs and KM objectives is fairly intuitive. However, it was critical to convey the potential added value that KM systems are able to provide to the Base

Camp CoP in order to receive at least a partial buy-in from the conference attendees prior to conducting the requirement generation and validation process during the KM working group session at the conference.

Chapter 3: Workshop Plan

3.1 Transition from USMA to U.S. Army Engineering School (USAES)

The three Base Camp Conferences that had been held at the United States Military Academy prior to May 2006 (2001, 2004, & 2005) had all been jointly sponsored by the Department of Civil and Mechanical Engineering and the Department of Systems Engineering. There were several reasons why USMA was an ideal location to host these previous Base Camp Conferences:

- a) It possesses a high density of “intellectual capital” that is able to focus on solving this, and other, complex problems;
- b) It is a relatively short commute from Washington D.C., New York City, as well as Boston and the Greater New England area;
- c) West Point is able to leverage it’s status as both a National Historic Site, and also an attractive tourist destination during the month of May, in order to draw both senior military leaders and technical experts from across the spectrum of DoD organizations;
- d) Because of its reputation as an institution of higher learning, coupled with the joint and inter-agency research that goes on within it’s walls, USMA is considered by many senior leaders/ analysts/ technical experts to be “neutral turf” and is usually able to break down parochial, inter-service barriers that can sometimes arise during discussions with other services about inherently joint issues.

However, it was acknowledged at the 2005 Base Camp Conference that USMA did not have the manpower to both serve as the Army’s proponent for Base Camp and JFOB-related issues, and still perform all of the other missions that are required. Therefore, USMA was prepared to conduct a hand-off of institutional knowledge related to Base Camps/ JFOBs with whomever stepped up as the Army’s new proponent.

The need for an Army proponent was absolutely critical so that DOTMLPF issues could be brought to the attention of the Joint Operational Engineer Board (JOEB) (i.e. the board which consists of all of the armed services ‘Chiefs of Engineering’) for a decision, and ultimately, funding. As the search for an Army proponent for Base Camp-related issues continued, then COL (now BG) Todd Semonite, the Assistant Commandant at the U.S. Army Engineer School,

decided that the Engineer School would assume the mantle of responsibility as the Army's proponent for Base Camp-related issues and that the organization responsible for executing the plan would be the Directorate of Environmental Integration, led by Dr. Rebecca Johnson.

3.2 Collaborative Environment

The GroupSystems II collaborative software (GroupSystems, 2006) was used to facilitate the requirements generation and validation process during the KM working group session at the Base Camp Workshop in St. Louis in May 2006. The software was installed on networked laptop computers and running off of a server back in the Systems Engineering Department at West Point. The agenda for the working group session was meant to obtain unbiased and anonymous feedback from the base camp CoP and is shown below:

- a) Who did we want/ need to obtain knowledge from?
- b) Who did we want/ need to share knowledge with?
- c) What is our system environment (i.e. what are the existing or anticipated super-, lateral-, or sub-systems that attempt to share related types of information)?
- d) What should this site offer?
- e) What categories of knowledge do we want/ need to share?
- f) How is knowledge currently shared within the Base Camp CoP?
- g) What are the risks associated with this endeavor?
- h) Who should handle the various KM site management responsibilities?
- i) What should the site be named?

The facilitators for the working group gave participants a certain amount of time to enter information for each agenda topic (shown above) into GroupSystems. After each brain-storming period (where all entries were captured electronically in GroupSystems), the facilitators then used the GroupSystems functionality to publicly sort and prioritize the information that was captured during the brainstorming process for each agenda topic. The results for all of the topics on the agenda were then captured in a final MS Word report that was generated by GroupSystems. The data from this final report was then presented, along with the other working group results, to the conference attendees the following morning during our close-out session. While a comprehensive list of KM working group results exceeds the scope of this article, some of the key take-aways included:

- a) The following topic areas, which were obtained largely from the JFOB Force Protection Handbook (JFOB Quick Reaction Test Director, 2005) would be included as the primary sub-folders within the ArmyBaseCamp/JFOB.net professional KM forum:
1. JFOB Master and Force Protection Planning
 2. Intelligence Considerations and Threat Analysis
 3. Risk Assessment, Safety, and Course of Action Development
 4. Health and Environmental
 5. Sustainment and Maintenance
 6. Site Selection and Layout
 7. Perimeter and Internal Security
 8. Protective Construction and Infrastructure Assurance
 9. Incident Response and Consequence Management
 10. Public Outreach and Information Operations
 11. Communications and Computers
 12. Real Estate/ Real Property, Resourcing, and Funding Issues
 13. Training, Exercises, Conferences, Workshops, and Seminars
- b) A host of potential content, most of it unknown to the larger CoP body in attendance at the conference was identified; along with several other systems that offered complementary services.
- c) In addition to serving as the proponent for the Base Camp CoP, members of the U.S. Army Engineer School's Directorate of Environmental Integration, led by Dr. Rebecca Johnson, volunteered to serve in the majority of the key CoP leadership and administrative roles that are depicted in Figure 3 of this paper.
- d) The name ArmyBaseCamp/JFOB.net was chosen over other, more generic sounding or limited function names.

Chapter 4: Implementation

4.1 Planning for Action and Execution

Prior to the conclusion of the conference, the USMA study team met with the incumbent base camp CoP proponent team from the U.S. Army Engineer School in an effort to iron out implementation details. It was decided that the Engineer School's facilitator/ forum leader would be the lead developer for the implemented KM system for the base camp CoP. This forum leader traveled to West Point in June 2006 to obtain continuity data and capture lessons learned from USMA's previous annual Base Camp Workshops. The end result from the effort in June was to be a functional, well-codified, yet fledgling KM forum for the base camp CoP. The secondary purpose of the trip was to complete a draft of a written charter for the forum in order to clearly outline roles and responsibilities, energize senior leaders and forum members, and hold the base camp CoP accountable to its stated purpose.

4.2 Assessment and Control

Next to the stakeholder and functional analyses perhaps the next most important step is to determine the value that this KM initiative has added to the base camp CoP. While ArmyBaseCamp/JFOB.net forum membership and knowledge sharing continues to steadily grow, this study concedes that the existing COTS (i.e. BCKS) solution is less than optimal. Having said that, the community is scheduled to assess the state of KM initiatives at the next annual Base Camp Conference in 2007 to determine what the next steps the base camp CoP should take vis-à-vis KM initiatives. Figure 4 juxtaposes the objectives associated with KM initiatives with the metrics the professional forum leadership and administrators intend to capture and analyze in order to measure the value that ArmyBaseCamp/JFOB.net has added to the Base Camp CoP.

Aggregate
Stakeholder
Objectives for KM
Initiative (Maier,
2004)

1. ID Existing Knowledge
2. Improve Documentation of Existing Knowledge
3. Change (parts of) Organizational Culture
4. Improve Communication and Cooperation
5. Improve training, education, and networking of newly recruited employees
6. Improve training and education for all employees
7. Improve retention of knowledge
8. Improve access to existing sources of knowledge
9. Improve distribution of knowledge
10. Improve management of innovations

ArmyBaseCamp/
JFOB.net Measures of
Effectiveness (BCKS,
2006); *Assessment review
will occur at 2007 Base Camp
Conference*

Quantitative

- ☐ Membership trends (new, most active, participants, diversity, contributors, etc.)
- ☐ Functionality and topic discussions (topics, knowledge, contents, views, most active discussion groups, chat, search, page hits, etc.)
- ☐ Site usage matrix
- ☐ Number of documents downloaded by topic area
- ☐ Most frequently downloaded documents in rank order
- ☐ Number of problems brought to solution through ArmyBaseCamp/JFOB.net

Qualitative

- ☐ User satisfaction (satisfaction or specific knowledge goals)
- ☐ Identification of success stories.
- ☐ Innovation (increase in innovative/breakthrough ideas)

Figure 4. Objectives (revisited) and measures of effectiveness (MoE) of KM initiatives.

Chapter 5: Conclusions and Future Work

The 3rd Annual Base Camp Workshop in May 2006 attempted to achieve closure on some very long-standing issues related to the Base Camp CoP. The fact that the U.S. Army Engineer School volunteered to serve as the Army's proponent for this community was incredibly significant. Their willingness to take ownership for the systemic problems associated with Base Camp Life-Cycle management issues facilitated the establishment of an interim KM solution. Furthermore, the purpose of this paper was to convey the process that occurred as a result of developing and implementing this KM solution on behalf of the Base Camp CoP.

It should be noted that at the time of publication, ArmyBaseCamp/JFOB.net has facilitated (at times significant) dialogue on other topics that are relevant to this community of practice. The topic that has provided the greatest opportunity for both operational and intellectual collaboration is the topic of Stability and Reconstruction Operations (S&RO). The authors believe that the KM initiatives that were born out of the 3rd Annual Base Camp Workshop will continue to help foster related research opportunities in the future between seemingly disparate entities that are seeking solutions in an increasingly complex and networked world.

Finally, the engineering management audience should recognize the similarities between Base Camp Life-Cycle management, and any other complex, ill-defined problem that they are likely to face out in industry. More specifically, the authors believe that this complex life-cycle management problem facing the DoD lends itself (at least in part) to being a target for the effective use of a KM solution, which in turn should be considered as a viable option by the engineering management professional should they be faced with a similar scenario.

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Appendix A: List of Abbreviations

B	
BCKS	Battle Command Knowledge System
C	
CoP	Community of Practice
D	
DoD	Department of Defense
DOTMLPF	Doctrine, Organization, Training, Materiel, Leadership and Education, Personnel and Facilities
E	
EM	Engineering Management
I	
IEEE	Institute of Electrical and Electronics Engineers
J	
JFOB	Joint Forward Operating Base
JOEB	Joint Operational Engineer Board
K	
KM	Knowledge Management
M	
MOE	Measure(s) of Effectiveness
O	
ORCEN	Operations Research Center of Excellence
U	
USAES	U.S. Army Engineer School
USMA	United States Military Academy

*This table is sorted alphabetically

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14. ABSTRACT Establishing an effective and secure operating and logistics base under austere conditions, either at home or abroad, regardless of whether the origin of the crisis is military or strictly humanitarian in nature, is a complex mission. Unfortunately, the doctrine supporting the life-cycle management of base camp facilities is poorly codified and usually unstructured due to the disparate nature of the governmental organizations tasked with accomplishing these missions. In order to overcome this problem, the Department of Systems Engineering at the United States Military Academy (USMA) at West Point has developed functional and non-functional requirements for, and has partially implemented a commercial-off-the-shelf (COTS) knowledge management (KM) system that facilitates the sharing of this type of specialized information for military and civilian members of the "Base Camp Community of Practice (CoP)".					
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